

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 13 June 2000 (13.06.00)	
International application No. PCT/EP99/07934	Applicant's or agent's file reference N1403-PCT
International filing date (day/month/year) 19 October 1999 (19.10.99)	Priority date (day/month/year) 19 October 1998 (19.10.98)
Applicant FAUCONNIER, Denis	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
09 May 2000 (09.05.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer C. Cupello Telephone No.: (41-22) 338.83.38
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PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BIRD, Ariane
Bird Goën & Co.
Vilvoordsebaan 92
B-3020 Winksele
BELGIQUE

Date of mailing (day/month/year) 13 June 2000 (13.06.00)	
Applicant's or agent's file reference N1403-PCT	IMPORTANT NOTIFICATION
International application No. PCT/EP99/07934	International filing date (day/month/year) 19 October 1999 (19.10.99)

1. The following indications appeared on record concerning:

☐ the applicant
 ☐ the inventor
 ☒ the agent
 ☐ the common representative

Name and Address BIRD, Ariane Bird Goën & Co. Termerestraat 1 B-3020 Winksele Belgium	State of Nationality	State of Residence
	Telephone No. +32-16-480562	
	Facsimile No. +32-16-480528	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
 ☐ the name
 ☒ the address
 ☐ the nationality
 ☐ the residence

Name and Address BIRD, Ariane Bird Goën & Co. Vilvoordsebaan 92 B-3020 Winksele Belgium	State of Nationality	State of Residence
	Telephone No. +32-16-480562	
	Facsimile No. +32-16-480528	
	Teleprinter No.	

3. Further observations, if necessary:

The new agent's address on the Demand has been considered as a change under Rule 92bis. In case of disagreement, the International Bureau should be notified immediately.

4. A copy of this notification has been sent to:

☒ the receiving Office
 ☐ the designated Offices concerned
☐ the International Searching Authority
 ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority
 ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer C. Cupello Telephone No.: (41-22) 338.83.38
---	--

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BIRD, Ariane
Bird Goën & Co.
Vilvoordsebaan 92
B-3020 Winksele
BELGIQUE

Date of mailing (day/month/year) 06 April 2001 (06.04.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference N1403-PCT	
International application No. PCT/EP99/07934	International filing date (day/month/year) 19 October 1999 (19.10.99)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address NORTEL MATRA CELLULAR 1, place des Frères Montgolfier F-78928 Guyancourt Cedex 9 France	State of Nationality FR	State of Residence FR
	Telephone No. +33-1-39 444 444	
	Facsimile No. +33-1-39 445 002	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address NORTEL NETWORKS LIMITED World Trade Center 8th Floor 380 St. Antoine Street West Montréal, Quebec H2Y 3Y4 Canada	State of Nationality CA	State of Residence CA
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Marie-José Devillard Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BIRD, Ariane
Bird Goën & Co.
Vilvoordsebaan 92
B-3020 Winksele
BELGIQUE

Date of mailing (day/month/year) 29 March 2001 (29.03.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference N1403-PCT	
International application No. PCT/EP99/07934	International filing date (day/month/year) 19 October 1999 (19.10.99)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address NORTEL MATRA CELLULAR 1, place des Frères Montgolfier F-78928 Guyancourt Cedex 9 France	State of Nationality FR	State of Residence FR
	Telephone No. +33-1-39 444 444	
	Facsimile No. +33-1-39 445 002	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☒ the name ☒ the address ☒ the nationality ☒ the residence

Name and Address NORTEL NETWORKS LIMITED World Trade Center 8th Floor 380 St. Antoine Street West Montréal, Quebec H2Y 3Y4 Canada	State of Nationality CA	State of Residence CA
	Telephone No. +33-1-39 444 444	
	Facsimile No. +33-1-39 445 002	
	Teleprinter No.	

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Dorothee Mülhausen Telephone No.: (41-22) 338.83.38
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PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference N1403-PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/EP 99/ 07934	International filing date (day/month/year) 19/10/1999	(Earliest) Priority Date (day/month/year) 19/10/1998
Applicant NORTEL MATRA CELLULAR et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

6

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/07934

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/38 H04Q7/32 H04B7/005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 24897 A (NOKIA) 10 July 1997 (1997-07-10) page 6, line 21 -page 8, line 28; figures	1, 8, 13, 14, 17, 19
A	WO 98 36607 A (QUALCOMM) 20 August 1998 (1998-08-20) page 7, line 29 -page 27, line 19; figures	1-14, 17-20
A	WO 98 32262 A (QUALCOMM) 23 July 1998 (1998-07-23) page 6, line 4 -page 15, line 29; figures	1-14, 17-20
A	WO 91 07037 A (QUALCOMM) 16 May 1991 (1991-05-16) cited in the application page 14, line 3 -page 25, line 8; figures	15, 16
	-/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"Z" document member of the same patent family

Date of the actual completion of the international search

2 February 2000

Date of mailing of the international search report

09/02/2000

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Geoghegan, C

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/07934

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	EP 0 883 251 A (NOKIA) 9 December 1998 (1998-12-09) page 5, line 47 -page 10, line 34; figures	15, 16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 99/07934

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
W0 9724897	A	10-07-1997	FI	956356 A	30-06-1997
			AU	1099297 A	28-07-1997
			CA	2241752 A	10-07-1997
			EP	0870409 A	14-10-1998
			JP	11511919 T	12-10-1999
W0 9836607	A	20-08-1998	US	5999816 A	07-12-1999
			AU	6329998 A	08-09-1998
			EP	0962115 A	08-12-1999
			ZA	9801291 A	17-08-1998
W0 9832262	A	23-07-1998	US	5940761 A	17-08-1999
			AU	5804498 A	07-08-1998
			EP	0956679 A	17-11-1999
			ZA	9800082 A	08-07-1998
W0 9107037	A	16-05-1991	US	5056109 A	08-10-1991
			AT	163822 T	15-03-1998
			AU	646001 B	03-02-1994
			AU	6728390 A	31-05-1991
			CA	2072989 A	08-05-1991
			CN	1053870 A, B	14-08-1991
			CN	1090107 A, B	27-07-1994
			CN	1159720 A	17-09-1997
			DE	69032105 D	09-04-1998
			DE	69032105 T	08-10-1998
			EP	0500689 A	02-09-1992
			ES	2113862 T	16-05-1998
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			GR	3026454 T	30-06-1998
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			MX	172367 B	14-12-1993
			NO	304206 B	09-11-1998
			SG	48360 A	17-04-1998
			US	5485486 A	16-01-1996
			US	5265119 A	23-11-1993
			US	5257283 A	26-10-1993
			US	5267262 A	30-11-1993
EP 883251	A	09-12-1998	US	5940743 A	17-08-1999



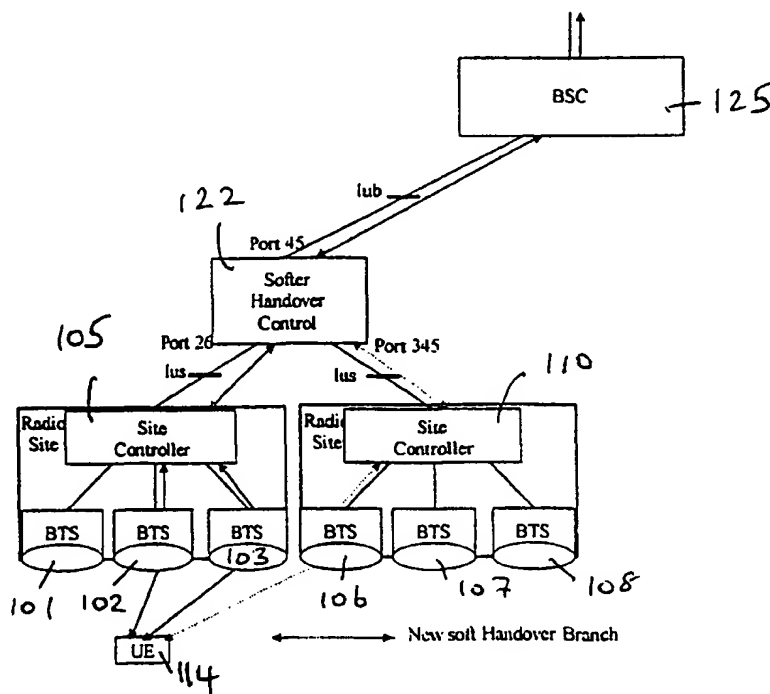
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : H04Q 7/38, 7/32, H04B 7/005	A1	(11) International Publication Number: WO 00/24213 (43) International Publication Date: 27 April 2000 (27.04.00)
(21) International Application Number: PCT/EP99/07934 (22) International Filing Date: 19 October 1999 (19.10.99) (30) Priority Data: 98402598.1 19 October 1998 (19.10.98) EP (71) Applicant (for all designated States except US): NORTEL MATRA CELLULAR [FR/FR]; 1, place des Frères Montgolfier, F-78928 Guyancourt Cedex 9 (FR). (72) Inventor; and (75) Inventor/Applicant (for US only): FAUCONNIER, Denis [FR/FR]; 13, avenue Guy de Coubertin, F-78470 Saint-Rémy Lès Chevreuse (FR). (74) Agents: BIRD, Ariane et al.; Bird Goën & Co., Termerestraat 1, B-3020 Winksele (BE).		(81) Designated States: BR, CA, CN, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.

(54) Title: METHOD AND APPARATUS FOR SETTING UP A COMMUNICATION WITH A TARGET BASE STATION IN A CELLULAR OR CORDLESS MOBILE TELECOMMUNICATIONS SYSTEM

(57) Abstract

Methods, systems and network elements are described to improve the speed of handover in a mobile radio telecommunications system. In one embodiment a mobile terminal (114) transmits a list of addresses of network nodes (102, 103, 105, 122, 125) to a target base station (106) in preparation for setting up a new radio link to the target base station (106). The list of addresses can be used by the target base station (106) to select a node (122, 125) which is common to both the old and the new communication path and to address this node directly without requiring a cross-over switch network query. The new path (122, 110, 106) can then be set up quickly ready for the handover to target base station (106). In a further embodiment the network distributes pre-authenticated signatures for a mobile terminal (114) to the nodes (102, 103, 105, 122, 125) of the network currently supporting a communication. This allows local verification of a mobile terminal (114) when it attempts to set up a new radio link with a target base station (106). In yet a further embodiment the target base station (106) starts fast power control with the mobile terminal (114) before the new communications path (125, 110, 106) has been set up through the network.



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Claims

1. A method of operating a telecommunications system in which mobile terminals may communicate with base stations over an air interface and a communications network is provided for linking each base station to other points in the network via one or more nodes, a communication to another user terminal being supported by one or more first radio links between one or more current base stations and a mobile terminal through a plurality of current nodes of the system, the method comprising the steps of:
 - providing to the mobile terminal information defining explicitly a least some of the current nodes of the communications network supporting the communication; and, in preparation for setting up a further radio link between the mobile terminal and a target base station while the current one or more first radio links are still supporting the communication or one or more of the first radio links has just been lost: the mobile terminal transmitting the information defining explicitly a least some of the current nodes of the communications network supporting the communication to the target base station.
2. A method according to claim 1, wherein the information is list of addresses of the relevant network nodes.
3. A method according to claim 1 or 2, further comprising the step of at least partially re-using the old communication path supporting the one or more first radio links for the new communication path including the further radio link, whereby the reused part of the old communication path terminates on one of the nodes defined in the information.
4. A method according to any of the previous claims, wherein the method is part of handover procedure or call re-establishment or assignment of a target base station to candidate set from neighbour set or assignment of a target base station from candidate set to active set.
5. A method according to claim 4, wherein the method is part of a handover procedure and the further radio link is set up before the one or more first radio links are terminated.

6. A method according to any previous claim, further comprising the steps of: providing the mobile terminal with pre-authenticated reference data for that mobile terminal; copying the pre-authenticated reference data to at least some of the current nodes of the communications network supporting the communication; and, in preparation for setting up the further radio link between the mobile terminal and the target base station: the mobile terminal transmitting at least a part of the pre-authenticated reference data to the target base station.
7. A method according to any previous claim, further comprising the step of: the target base station beginning fast power control with the mobile terminal in preparation for setting up the further radio link between the mobile terminal and the target base station before the path through the network supporting the further radio link is complete.
8. A telecommunication system in which mobile terminals communicate with base stations over radio links, comprising: a communications network for linking each base station to other points in the network via one or more nodes, a communication between a mobile terminal and another user terminal being connected via one or more first radio links to one or more current base stations and through a plurality of current nodes of the network, wherein, in preparation for setting up a further radio link between the mobile terminal and a target base station while the current one or more first radio links are still supporting the communication or one or more of the first radio links has just been lost, the mobile terminal is adapted to transmit to the target base station information defining explicitly at least some of the current nodes of the communications network supporting the communication.
9. A system according to claim 8, wherein the information is list of addresses of the relevant network nodes.
10. A system according to claim 8 or 9, wherein the communication path including the further radio link partially re-uses the communication path including the one or more first radio links, the reused part terminating on one of the nodes defined in the information.

11. A system according to any of the claims 8 to 10, wherein the system is adapted to provide the mobile terminal with pre-authenticated reference data for that mobile terminal and for copying the pre-authenticated reference data to at least some of the current nodes of the communications network supporting the communication, and, in preparation for setting
5 up the further radio link between the mobile terminal and the target base station, the mobile terminal is adapted to transmit to the target base station at least a part of the pre-authenticated reference data.

12. A system according to any of the claims 8 to 11, wherein the target base station is
10 adapted to begin fast power control with the mobile terminal station before the path through the network supporting the further radio link is complete.

13. A method of operating a telecommunications system in which mobile terminals may communicate with base stations over an air interface and a communications network is
15 provided for linking each base station to other points in the network via one or more nodes, a communication to another user terminal being supported by one or more first radio links between one or more current base stations and a mobile terminal through a plurality of current nodes of the system, the method comprising the steps of: providing the mobile terminal with pre-authenticated reference data for that mobile terminal; copying the pre-authenticated reference data to at least some of the current nodes of the communications
20 network supporting the communication; and, in preparation for setting up a further radio link between the mobile terminal and a target base station while the current one or more first radio links are still supporting the communication or one or more of the first radio links have just been lost: the mobile terminal transmitting at least a part of the pre-authenticated
25 reference data to the target base station.

14. A telecommunication system in which mobile terminals communicate with base stations over radio links, comprising:
a communications network for linking each base station to other points in the network via
30 one or more nodes, a communication between a mobile terminal and another user terminal being connected via one or more first radio links to one or more current base stations and through a plurality of current nodes of the network, wherein, the system is adapted to

provide the mobile terminal with pre-authenticated reference data for that mobile terminal and for copying the pre-authenticated reference data to at least some of the current nodes of the communications network supporting the communication, and, in preparation for setting up a further radio link between the mobile terminal and a target base station while the
5 current one or more first radio links are still supporting the communication or one or more of the first radio links have just been lost, the mobile terminal is adapted to transmit to the target base station at least a part of the pre-authenticated reference data.

15. A method of operating a telecommunications system in which mobile terminals may
10 communicate with base stations over an air interface and a communications network is provided for linking each base station to other points in the network via one or more nodes, a communication to another user terminal being supported by one or more first radio links between one or more current base stations and a mobile terminal through a plurality of current nodes of the system, the method comprising the steps of:
15 in preparation for setting up a further radio link between the mobile terminal and a target base station while the current one or more first radio links are still supporting the communication or one or more of the first radio links has just been lost:
the target base station beginning fast power control with the mobile terminal before the path through the network supporting the further radio link is complete.

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16. A telecommunication system in which mobile terminals communicate with base stations over radio links, comprising:
a communications network for linking each base station to other points in the network via one or more nodes, a communication between a mobile terminal and another user terminal
25 being connected via one or more first radio links to one or more current base stations and through a plurality of current nodes of the network, wherein, in preparation for setting up a further radio link between the mobile terminal and a target base station while the current one or more first radio links are still supporting the communication or one or more of the first radio links has just been lost, the target base station is adapted to begin fast power
30 control with the mobile terminal station before the path through the network supporting the further radio link is complete.

17. A mobile terminal for use in a telecommunication system in which mobile terminals communicate with base stations over a radio interface via one or more radio links, the mobile terminal being adapted to transmit to a target base station information defining explicitly at least some of the current switching nodes of the communications network supporting an existing communication between the mobile terminal and one or more current base stations over one or more current radio links in preparation for setting up a new radio link between the mobile terminal and the target base station while the one or more current radio links are supported or have just been lost.
18. A mobile terminal according to claim 17, wherein the information is list of addresses of the relevant communications network nodes.
19. A network element for use in a telecommunication system in which mobile terminals communicate with base stations over radio links, the network element being adapted to receive information explicitly defining at least some of the current nodes of the communications network supporting an existing communication between a mobile terminal and one or more current base stations over one or more current radio links, and for setting up a communications path with a further network element using the explicit information in preparation for setting up a further radio link between the mobile terminal and the target base station while the current radio links are still supported or have just been lost.
20. A system or method according to any previous claims, wherein the explicit information defining nodes supporting the existing communication includes explicit information defining at least two levels of a hierarchical telecommunications network.

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PATENT COOPERATION TREATY

PCT

REC'D 25 JAN 2001

WIPO

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference N1403-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP99/07934	International filing date (day/month/year) 19/10/1999	Priority date (day/month/year) 19/10/1998
International Patent Classification (IPC) or national classification and IPC H04Q7/38		
Applicant NORTEL MATRA CELLULAR et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 11 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of five sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 09/05/2000	Date of completion of this report 22.01.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Aguilar Cabarrus, E Telephone No. +49 89 2399 7524 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP99/07934

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:

Description, pages:

1-24 as originally filed

Claims, No.:

1-22 with telefax of 01/12/2000

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP99/07934

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
☒ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☒ not complied with for the following reasons:
see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-22
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-22
	No:	Claims	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP99/07934

Industrial applicability (IA) Yes: Claims 1-22
 No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP99/07934

Reference is made to the following documents:

D1: WO 97 24897 A
D2: WO 98 36607 A
D3: WO 98 32262 A
D4: WO 91 07037 A

Re Item IV

Lack of unity of invention

The present claims relate to inventions which are not so linked as to form a single general inventive concept, Rule 13.1 PCT. The inventions are as follows:

Invention I: Claims 1-12, 17-22
Invention II: Claims 13, 14
Invention III: Claims 15, 16

Invention I is directed to a method of operating a telecommunication system and the corresponding telecommunication system, mobile terminal and network element, in which the mobile terminal is provided with **information** which, in preparation for setting up a further radio link between the mobile terminal and a target base station, **is transmitted by the mobile station** to the target base station (known from **D1**, page 6, line 27 - page 7, line 9; **D2**, page 4, lines 10-14 and **D3**, page 4, lines 10-14), this **information** defining explicitly at least **some of the current nodes** of the communications network supporting the communication.

Invention II is directed to a method of operating a telecommunication system and the corresponding telecommunication system, in which a mobile terminal is provided with **information** which, in preparation for setting up a further radio link between the mobile terminal and a target base station, **is transmitted by the mobile station** to the target base station (known from **D1**, page 6, line 27 - page 7, line 9; **D2**, page 4, lines 10-14 and **D3**, page 4, lines 10-14), this **information** being **at least a part of the preauthenticated reference data**.

Invention III is directed to a method of operating a telecommunication system and to the corresponding telecommunication system, in which a target base station **begins a fast power control** with a mobile terminal **before the path through the network supporting a further radio link is complete**.

Inventions I and II are related as possible solutions for the known problem of improving the handover performance of a mobile communication. **Inventions I and II**, however, do not have to utilize the specifically claimed aspects of one another. There is no technical relationship of the required kind among the problems they solve (how to speed up the **reconstruction of the path** through the **network nodes** for **invention I** and how to speed up the **authentication** procedure for **invention II**), and hence among the solutions as represented by the claimed **inventions I and II**.

Invention III limits some of the disturbing effects of a mobile terminal starting the fast power control as soon as possible. **Invention III**, however, does not have to utilize the specifically claimed aspects of **transmitting information** of the **network nodes** or the **preauthenticated reference data** of **inventions I and II**, respectively.

When entering into the **regional phase**, the applications should be divided into **divisional applications**, each of which relates to one of these inventions listed above.

The respective divisional applications should be **limited** to one of the inventions each, and those parts of the application relating to the other inventions should be eliminated from the description.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

I. First invention according to claims 1-12, 17-22

- I.1** The first invention relates to a **method** of operating a communications system in which mobile terminals may communicate with base stations over an air interface

wherein a communications network is provided for linking each base station to other points in the network via one or more nodes **and** to the corresponding **telecommunication system, mobile terminal and network element** according to respective independent **claims 1, 8, 17 and 19**.

- I.2** When a mobile terminal moves during a communication from one cell served by a base station (original base station) to another cell it is necessary to "handover" the mobile terminal to the base station (target base station) of the new cell. **Handover** procedures are **well known in the art**.

Document **D1** describes a method for setting up a communication with a target base station in a mobile telecommunication system when a call has been lost after an inter-MSC (Mobile Switching Center) handover. **Information** is sent **by the mobile terminal to the target base station** containing the Last Location Area Identifier of the mobile station.

- I.3** A main **disadvantage** related to the known handover procedure is the time needed to perform it since the ongoing communication is interrupted during this time. Particularly, telephone conversations are considered to require a very quick handover with little loss or delay of the communication.
- I.4** The **first invention** overcomes this problem by providing a **method** for setting up a communication with a target base station in a mobile telecommunication system, the corresponding **telecommunication system, mobile terminal and network element** according to respective independent **claims 1, 8, 17 and 19**.

According to the **essential features of the first invention**, in preparation for setting up a further radio link between the mobile terminal and a target base station, **information** defining explicitly at least some of the **current nodes** of the communications network supporting the communication and which has been provided to the mobile terminal in a preceding step, is sent by the mobile station to the target base station.

- I.5** The first invention provides the **advantage** of allowing a rapid setting up of a partly new path to the target base station while maintaining optimal use of existing paths

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of the communication.

- I.6** The subject-matter of the first invention as claimed in respective independent claims 1, 8, 17 and 19 is neither disclosed in, nor rendered obvious by the remaining **prior art documents** cited in the international search report since said documents do **not** describe the method, telecommunication system or mobile station according to the particular feature combination of the present invention or part thereof as defined in respective claims 1, 8, 17 and 19. Documents **D2** and **D3** are related to the handover procedure but dealing with other aspects and document **D4** describes a power control system for a mobile telephone system.
- I.7** The subject-matter of respective independent claims 1, 8, 17 and 19 is, therefore, considered to be **new** and to **involve an inventive step**, Articles 33(2) and (3) PCT.
- I.8** As **claims 2 to 7 and 20, 9 to 12 and 21, 18 and 22** are dependent on respective claims 1, 8 and 17, said claims do **also meet** the requirements of Articles 33(2) and (3) PCT.
- I.9** The first invention is **susceptible of industrial application**, Article 33(4) PCT.

II. Second invention according to claims 13,14

- II.1** The second invention relates to a **method** of operating a communications system in which mobile terminals may communicate with base stations over an air interface wherein a communications network is provided for linking each base station to other points in the network via one or more nodes **and** to the corresponding **telecommunication system** according to respective independent **claims 13 and 14**.
- II.2** When a mobile terminal moves during a communication from one cell served by a base station (original base station) to another cell it is necessary to "handover" the mobile terminal to the base station (target base station) of the new cell. **Handover** procedures are **well known in the art**.

Document **D1** describes a method for setting up a communication with a target base

station in a mobile telecommunication system when a call has been lost after an inter-MSC (Mobile Switching Center) handover. **Information** is sent **by the mobile terminal to the target base station** containing the Last Location Area Identifier of the mobile station.

- II.3** A main **disadvantage** related to the known handover procedure is the time needed to perform it since the ongoing communication is interrupted during this time. Particularly, telephone conversations are considered to require a very quick handover with little loss or delay of the communication.
- II.4** The **second invention** overcomes this problem by providing a **method** for setting up a communication with a target base station in a mobile telecommunication system and the corresponding **telecommunication system** according to respective independent **claims 13 and 14**.

According to the **essential features of the second invention**, in preparation for setting up a further radio link between the mobile terminal and a target base station, **information** defining at least a part of the **pre-authenticated reference data** and which has been provided to the mobile terminal in a preceding step, is sent by the mobile station to the target base station.

- II.5** The second invention provides the **advantage** of allowing rapid verification of the signature of the mobile station.
- II.6** The subject-matter of the second invention as claimed in respective independent claims 13 and 14 is neither disclosed in, nor rendered obvious by the remaining **prior art documents** cited in the international search report since said documents do **not** describe the method or telecommunication system according to the particular feature combination of the present invention or part thereof as defined in respective claims 13 and 14. Documents **D2** and **D3** are related to the handover procedure but without the smallest relationship to the authentication procedure; document **D4** describes a power control system for a mobile telephone system.
- II.7** The subject-matter of respective independent claims 13 and 14 is, therefore, considered to be **new** and to **involve an inventive step**, Articles 33(2) and (3) PCT.

II.8 The second invention is **susceptible of industrial application**, Article 33(4) PCT.

III. Third invention according to claims 15,16

III.1 The third invention relates to a **method** of operating a communications system in which mobile terminals may communicate with base stations over an air interface wherein a communications network is provided for linking each base station to other points in the network via one or more nodes **and** to the corresponding **telecommunication system** according to respective independent **claims 15 and 16**.

III.2 When a mobile terminal moves during a communication from one cell served by a base station (original base station) to another cell it is necessary to "handover" the mobile terminal to the base station (target base station) of the new cell. In some mobile communication systems (spread spectrum) the fast power control is essential to avoid interference. Both the **handover** and the **fast power control** procedures are **well known in the art**.

Document **D1** describes a method for setting up a communication with a target base station in a mobile telecommunication system when a call has been lost after an inter-MSC (Mobile Switching Center) handover. Furthermore, document **D4** discloses a method for controlling the transmission power in a CDMA cellular mobile telephone system.

III.3 A main **disadvantage** related to the control of the transmission power of a mobile station are the disturbing effects of the mobile station close to the border of one cell on a neighbouring cell like it is the case during a handover procedure.

III.4 The **third invention** overcomes this problem by providing a **method** for setting up a communication with a target base station in a mobile telecommunication system and the corresponding **telecommunication system** according to respective independent **claims 15 and 16**.

According to the **essential features of the third invention**, in preparation for setting up a further radio link between the mobile terminal and a target base station, the

target base station **begins the fast power control** with the mobile terminal **before the path** through the network supporting the further radio link **is complete**.

III.5 The third invention provides the **advantage** of limiting the disturbing effects of a mobile terminal close to the border of one cell on a neighbouring cell.

III.6 The subject-matter of the present invention as claimed in respective independent claims 15 and 16 is neither disclosed in, nor rendered obvious by the remaining **prior art documents** cited in the international search report since said documents do **not** describe the method or telecommunication system according to the particular feature combination of the present invention or part thereof as defined in respective claims 15 and 16. Documents **D2** and **D3** are related to the handover procedure but do not observe the possibility of an earlier fast power control; document **D4** describes a power control system for a mobile telephone system but without the smallest relationship to the handover procedure.

III.7 The subject-matter of respective independent claims 15 and 16 is, therefore, considered to be **new** and to **involve an inventive step**, Articles 33(2) and (3) PCT.

III.8 The third invention is **susceptible of industrial application**, Article 33(4) PCT.

Re Item VII

Certain defects in the international application

- 1.** The **drawings** do not meet the requirements of Rule 11.13 PCT.
- 2.** The **independent claims** are not in the **two-part form** in accordance with Rule 6.3(b) PCT.
- 3.** The features of the claims are not provided with **reference signs** placed in parentheses (Rule 6.2(b) PCT).
- 4.** Document **D1** and the **relevant background art** disclosed therein are not mentioned in the opening part of the description (Rule 5.1(a)(ii) PCT).